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Closing edge faces of multi-layer panels

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(72) Inventor(s)
Michael John Newey
Charles Damer Dawson

(73) Proprietor(s)
Newdawn & Sun Limited

(Incorporated in the United Kingdom)

The Angel House
Church Street
Alcester
Warwickshire
United Kingdom

(74) Agent and/or
Address for Service
Barker, Brettell & Duncan
138 Hagley Road
Edgbaston
Birmingham
B16 9PW
United Kingdom

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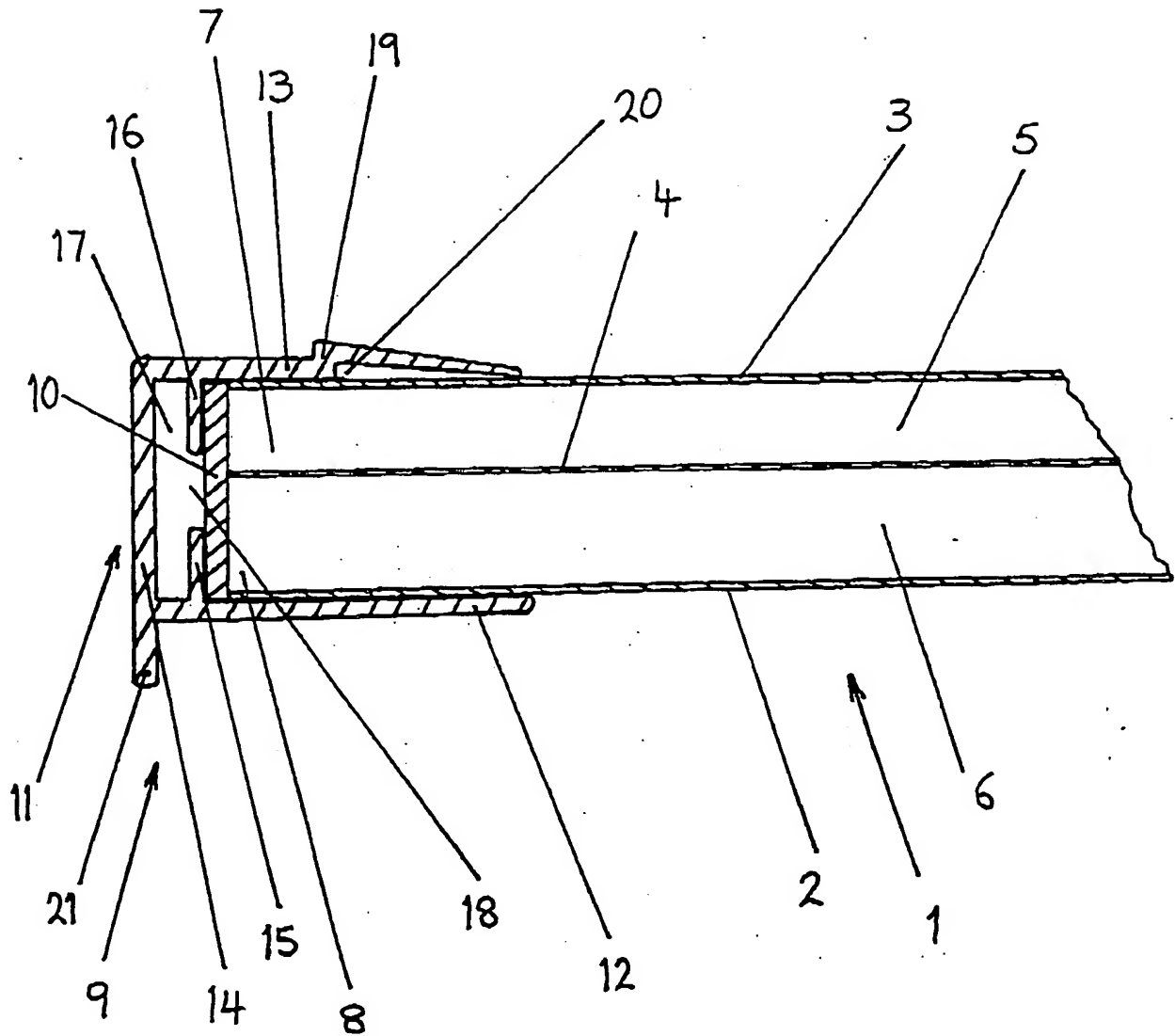


FIG. 1.

CLOSING EDGE FACES OF MULTI-LAYER PANELS

This invention relates to a method and apparatus for closing edge faces of multi-layer panel structures, particularly of the kind comprising at least two sheet-form layers held apart by spacers to form cavities between the layers.

Multi-layer structures of the kind set forth are known comprising two or more layers of synthetic materials such as polycarbonates, being used particularly for the roofs of glazed structures such as conservatories and greenhouses.

Edge faces of the panels need closing for protection from the weather, and to prevent the ingress of dust into intra-layer cavities whilst allowing the passage of air and water vapour. It is known to close the edge faces by means of metal or plastics closures which are easily applied, and removed, and are substantially weatherproof, but not sufficiently dustproof. Alternatively, it is known for the faces to be closed by a dustproof but water vapour permeable material, partially covered and retained on the multi-layer structure by an aluminium foil beaten round an edge portion of the panel. This latter closure has the disadvantage that it is time-consuming to apply satisfactorily, and after a time the foil tends to peel away, which is both unsightly and reduces the efficiency of the closure.

According to a first aspect of the present invention, a method of closing an edge face of a multi-layer panel structure comprises applying an air-permeable filter strip continuously along the edge face to seal against entry of dust between layers of the structure, and enclosing the filter strip by a

preformed weatherproof closure strip which embraces and grips an edge portion of the structure.

This has the advantage of providing a substantially dustproof and water vapour permeable material to close the panel edge continuously, the material being well protected by the closure strip which can be easy to apply and remove. The closure strip is preferably of a moulded plastics material.

The filter strip may be of a non-woven fabric. It may be treated with anti-fungal and/or anti-algal agents. An important function of the closure strip is to weatherproof the closure, and it may completely enclose the filter strip in use.

The filter strip and closure strip may simply be in abutment with one another, or they may be bonded to one another by adhesive, or held together by other suitable methods or types of fastening.

The closure strip preferably has one or more abutment portions for engaging the filter strip, and resilient means for gripping the edge portion of the panel to retain the filter strip in position on the panel edge face. Conveniently, the closure strip can comprise two spaced arm portions connected by a base portion. The abutment portions are preferably spaced from the base portion so as to define a ventilation duct which is in communication with the exterior of the structure. Preferably the abutment portions are in the form of opposing ribs extending from the arms. There may be a space between adjacent ends of the opposing ribs.

The duct defined within the closure strip is preferably continuous and open ended so as to link the interior of the panel structure with the outside via the filter strip.

One or more of the arm portions of the closure strip may form one or more channels in which a sealant or adhesive material may be provided to seal between the arm portion and the surface of the panel structure.

The closure strip may be formed as a continuous extrusion which can be cut to the length required for use. The filter strip may also be provided in continuous lengths for cutting to the length required. The two components may be pre-assembled in appropriate lengths prior to being applied to a panel edge face.

According to a second aspect of the present invention there is provided, for use in closing an edge face of a multi-layer panel structure, a preformed weatherproof closure strip in combination with an air-permeable filter strip adapted to be applied continuously along the edge face to seal against entry of dust between layers of the structure, the closure strip being arranged to embrace and grip an edge portion of the structure in enclosing the filter strip applied to the structure.

One example of performance of the invention will now be described with reference to the accompanying drawing of which the single Figure is a cross-section through an edge portion of a multi-layer panel structure which has an edge closure applied.

A multi-layer panel structure 1 comprises three flat sheets 2,3,4 of polycarbonate which are separated by spacers (not shown) to form cavities 5,6. The cavities present panel edge openings 7,8 which allow access to the interior of the structure 1 through an edge face of the panel. These openings 7,8 are closed, to prevent dust and other undesirable materials entering the cavities, by means of a closure 9.

The closure 9 comprises a first component in the form of a filter strip 10, which filters air entering the cavities, and a second component in the form of a weatherproof closure strip 11 which maintains the filter 10 in position to close the openings 7,8.

The filter 10 comprises a non-woven air-permeable fabric which permits the relatively free movement of air and water vapour through it, but prevents the entry of dust, insects and other undesirable bodies. The material is treated with anti-fungal and anti-algal agents to prevent their entry and growth within the interior of the structure and on the filter itself.

The closure strip 11 is formed as a plastics extrusion, preferably of PVC, and comprises projecting arm portions 12,13 connected by a closure part having a base portion 14 and abutment portions 15,16. The spaced arm portions 12,13 resiliently grip outer surfaces of outer sheets 2,3 of the structure, so as to retain the closure 9 on the structure 1. The abutment portions engage the filter strip 10. They project inwards from the arm portions 12,13, respectively, as mutually opposing ribs which are parallel to but spaced from the base portion 14 so as to define a ventilation duct 17 which runs the length of the closure strip. There is a gap 18 between the ends of the abutment

portions 15,16 which exposes a portion of the filter 10 to the duct 17. In this way the interior of the structure 1 (comprising the two cavities 5,6) is connected via the filter 10 and gap 18 to the duct 17, which is open at its ends to the exterior of the structure.

The one of the arms 13 which is on an upper side of the structure when in use is provided with a kink 19 defining an internal channel 20 which runs the length of the closure strip. An adhesive or other sealant material, such as a silicon mastic, is introduced into the channel 20 to enhance the integrity of the closure. The base portion has a lip 21, extending beyond the lower arm 12 to direct water away from the lower arm.

The filter 10 is attached to the abutment portions 15,16 by adhesive; in other constructions it could be unattached but trapped between the closure strip and the edge face of the panel.

During assembly the filter strip 10 and closure strip 11 are cut to the required length from stock material and the filter is attached to the abutment portions of the closure strip using an adhesive. The assembled closure 9, with adhesive or sealant provided in the channel 20, if required, is then pushed on to embrace the edge portion of the panel structure until the sheets abut the filter 10.

In a modification (not shown) holes could be provided in the base portion 14 or in the lower arm 12 of the closure strip 11, to connect the duct 17 more directly with the exterior if a higher potential rate of vapour or air transmission is required. A hole in

the arm 12 close to the lip 21 will be protected from any rainfall or other direct water contact.

In a further modification (not shown) the filter strip 10 may be arranged, in its position of use, to be spaced from the openings 7,8. In a further modification (not shown) the resilient portion of the closure strip 11 may be provided by the base portion 14, rather than by the arms 12,13 themselves.

In an alternative method of assembly, the filter 10 may first be applied to the edge face of the panel structure, for example being bonded by adhesive, and the closure strip may then be applied as described above.

CLAIMS

1. A method of closing an edge face of a multi-layer panel structure comprising applying an air-permeable filter strip continuously along the edge face to seal against entry of dust between layers of the structure, and enclosing the filter strip by a preformed weatherproof closure strip arranged to embrace an edge portion of the structure.
2. A method according to claim 1, in which the closure strip is of a moulded plastics material.
3. A method according to claim 1, or claim 2, in which the closure strip comprises two spaced arm portions connected by a base portion, the arm portions gripping the edge portion of the structure.
4. A method according to any preceding claim, in which the closure strip is provided with abutment portions which abut the filter strip.
5. A method according to claim 4, in which the abutment portions are provided by mutually opposing ribs projecting from the arm portions.
6. A method according to claim 5, in which there is a space between adjacent ends of the opposing ribs.
7. A method according to any of claims 4 to 6, in which the abutment portions are spaced from the base portion, the abutment portions and base portion defining a ventilation duct which communicates with the exterior of the structure.

8. A method according to any preceding claim, in which the filter strip and closure strip are simply in abutment.

9. A method according to any of claims 1 to 7, in which the filter strip and closure strip are bonded by adhesive.

10. A method according to any of claims 3 to 9, in which at least one of the arm portions forms a channel into which sealing material can be introduced to seal between the arm portion and the panel structure.

11. A method according to any preceding claim in which the filter strip is of a non-woven material and is treated with anti-fungal and/or anti-algal agents.

12. A method according to any preceding claim, in which the closure strip completely encloses the filter strip in use.

13. A method according to any preceding claim, in which the filter strip is assembled with the closure strip and both components are applied to the edge face.

14. For use in closing an edge face of a multi-layer panel structure, a preformed weatherproof closure strip in combination with an air-permeable filter strip adapted to be applied continuously along the edge face to seal against entry of dust between layers of the structure, the closure strip being arranged to embrace and grip an edge portion of the structure in enclosing the filter strip applied to the structure.

15. A combination according to claim 14, in which the closure strip forms a ventilation duct in communication with the filter strip.

16. A combination according to claim 14 or claim 15, in which the filter strip is bonded to the closure strip.

17. A method of closing an edge face of a multi-layer panel structure substantially as hereinbefore described.

18. A combination of a filter strip and a closure strip substantially as hereinbefore described with reference to the accompanying drawing.